



**Poseidon House
Castle Park
Cambridge CB3 0RD
United Kingdom**

TELEPHONE:
INTERNATIONAL:
FAX:
E-MAIL:

**Cambridge (01223) 515010
+44 1223 515010
+44 1223 359779
apm@ansa.co.uk**

Training

ANSAwise - Course Roundup [to Understanding Distributed Systems Architecture]

Chris Mayers

Abstract

This is the “goodbye speech” to the course “Understanding Distributed Systems Architecture”. As well as a summary of the key points, it gives information for finding out more.

[Since different course presentations offer a choices of modules, this presentation may need to be adjusted to cover different key points.

This session also covers commercial products briefly under ‘finding out more’. This should be expanded as we build up experience, possibly into separate modules.]

APM.1335.03

Approved
Briefing Note

24th April 1995

Distribution:

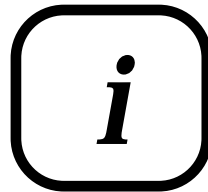
Supersedes:

Superseded by:



Understanding Distributed Systems Architecture

Course Roundup



...and Learning More...



About this course

- *It has only been possible to cover some aspects of distributed systems in this course*
 - the field is vast
- *However, there are some important and recurring ideas that are worth revisiting*



About distributed systems

- *Distributed systems are those which consist of interconnected cooperating components*
 - there is no central machine or group of machines
- *Distributed applications are those written for a distributed system*
- *Distributed processing is the method for designing and building distributed applications*
- *Distributed computing is the technology we use in distributed systems*



The demands of change

- *Pressures for change make distributed computing necessary, as well as possible*
 - in the near future, most systems will be distributed
 - world-wide business requires world-wide systems
- *Information networks are the starting point...*
- *... how to build systems to coordinate information from many sources?*
 - diverse sources: old systems, new systems, and other organizations' systems
 - separate sources: from different places at different times



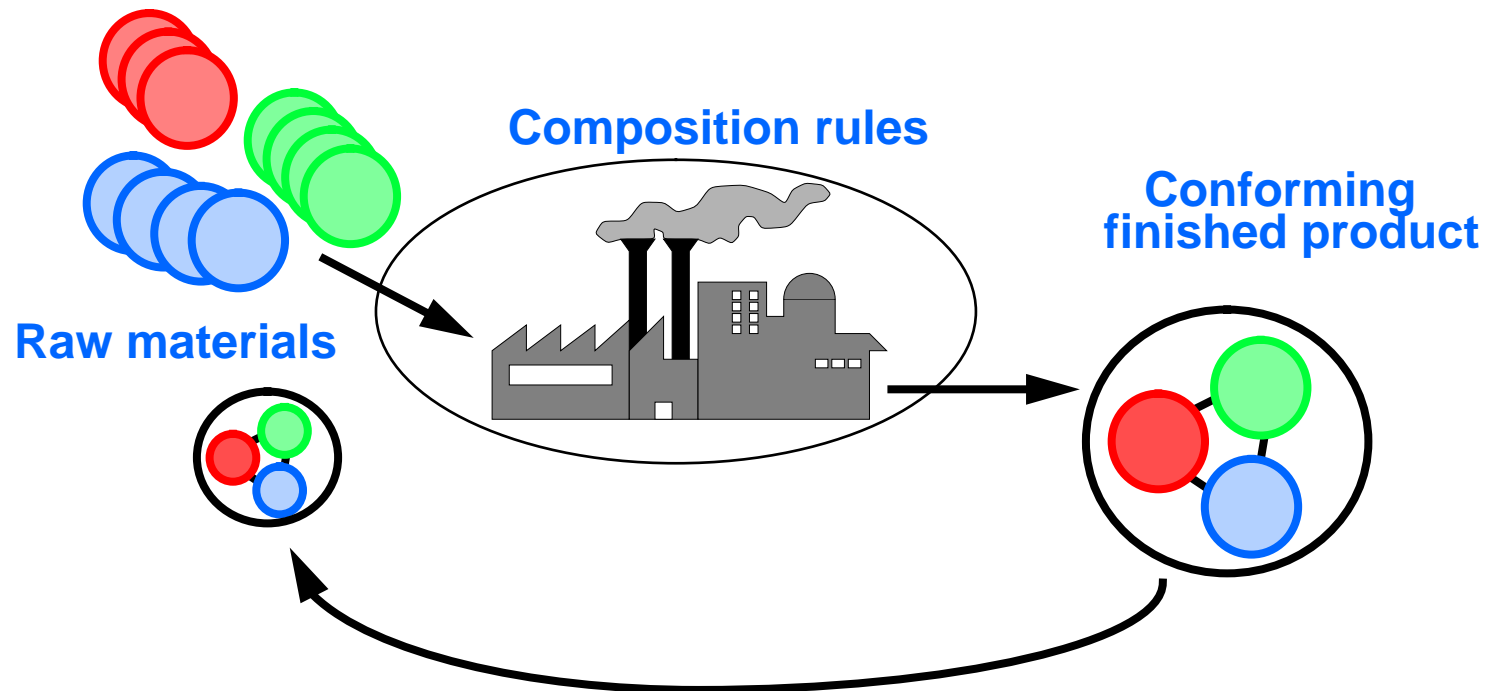
Distributed Systems Are Different

- Many traditional system design assumptions must be reversed

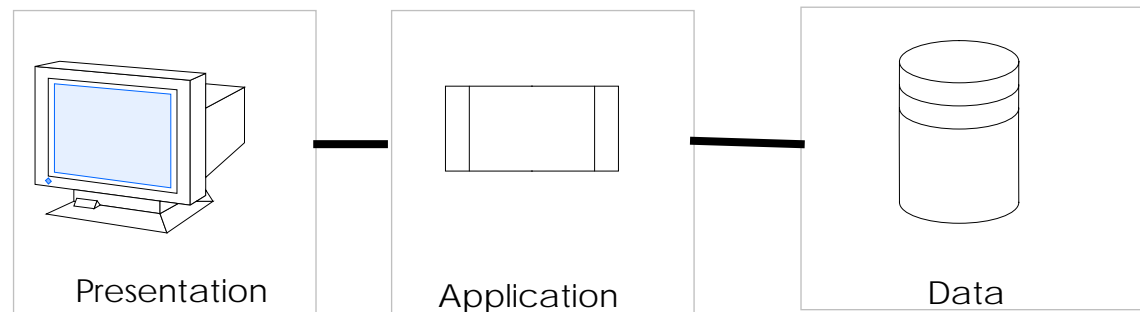
<i>Traditional</i>	<i>Reversed</i>
Local	Remote
Sequential	Concurrent
Homogeneous Environment	Diverse Environment
Fixed Location	Mobile
Single Copy	Multiple Copies
Synchronous	Asynchronous
Direct	Indirect
Shared	Separate
Global	Context Relative
Complete Failures	Partial Failures
Early Binding	Late Binding

- *A systematic approach is needed to avoid these assumptions*

Architecture for reuse

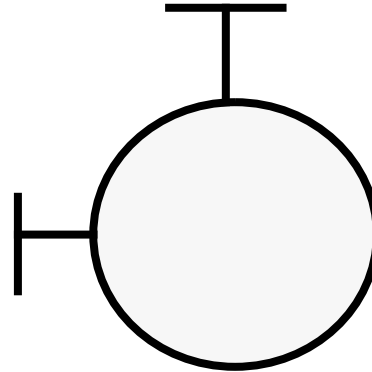


Application server approach



- *Exploits power of workstation and server*
- *Application can be managed from a single point*
- *... the approach is the way to exploit Distributed Processing*

Objects for encapsulation



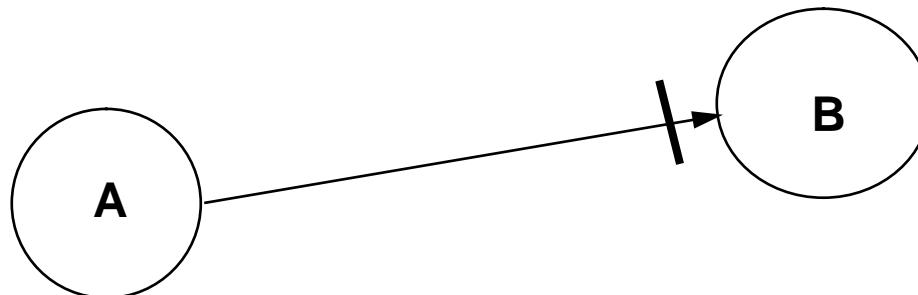
- *Objects are encapsulated...*
 - ...all interactions are via defined interfaces
 - ...all objects interact in the same way



Encapsulation for distributed objects

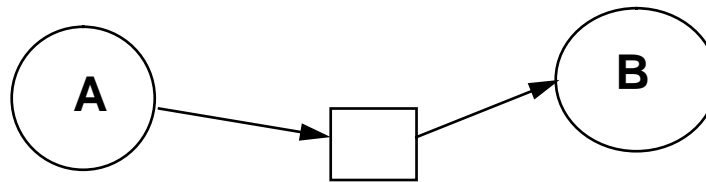
- *We cannot assume anything about the location of distributed objects*

Objects A and B could be on the same machine, or in different countries

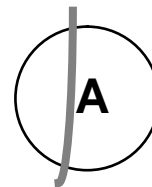


Encapsulation rules

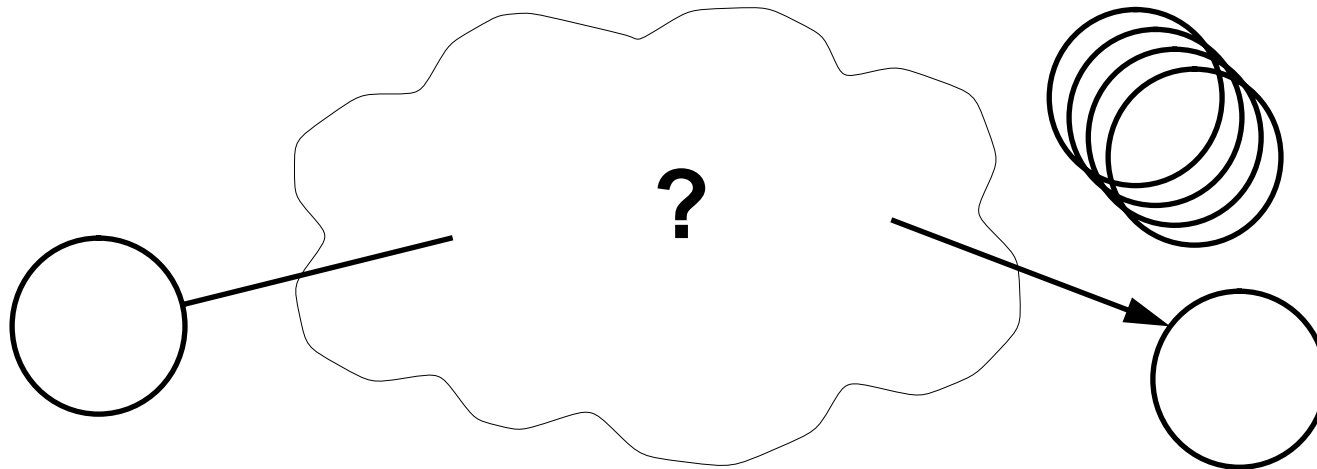
- **Objects cannot share state information directly (only pass it via interfaces)**
 - **this is not allowed**



- **One object cannot be distributed in pieces; it must be entirely in one place**
 - **this is not allowed**



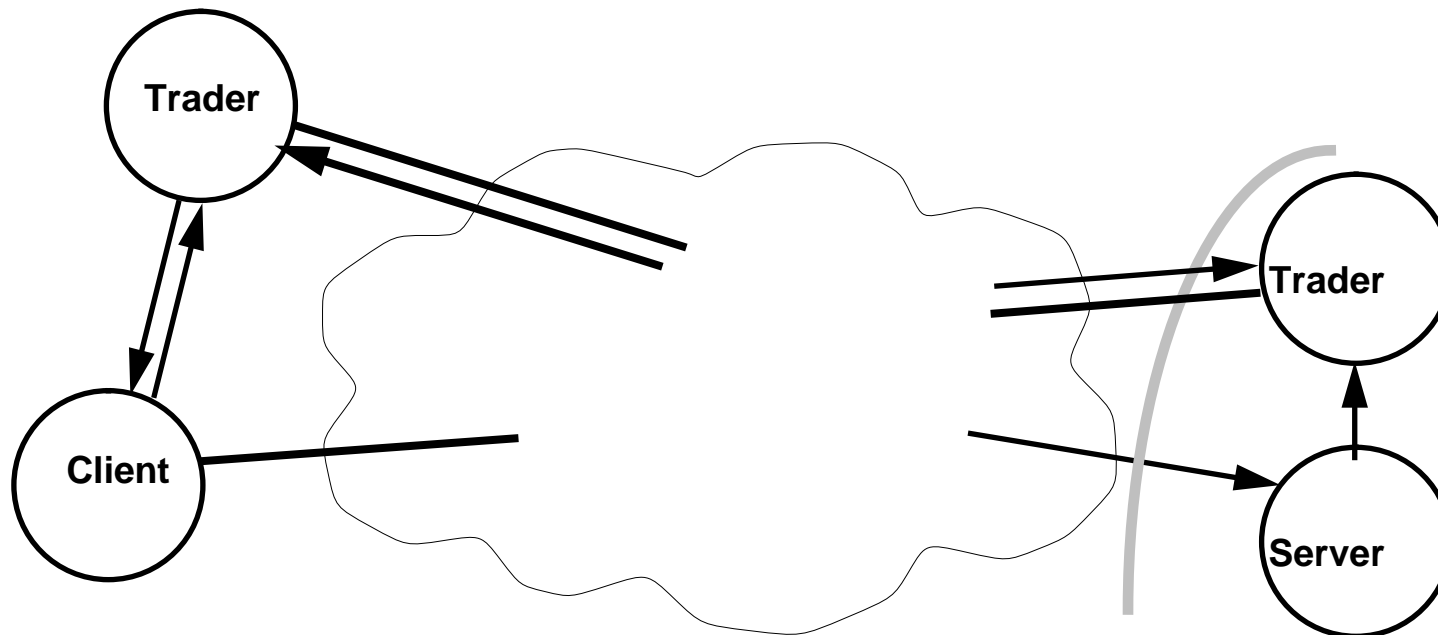
The need for Trading



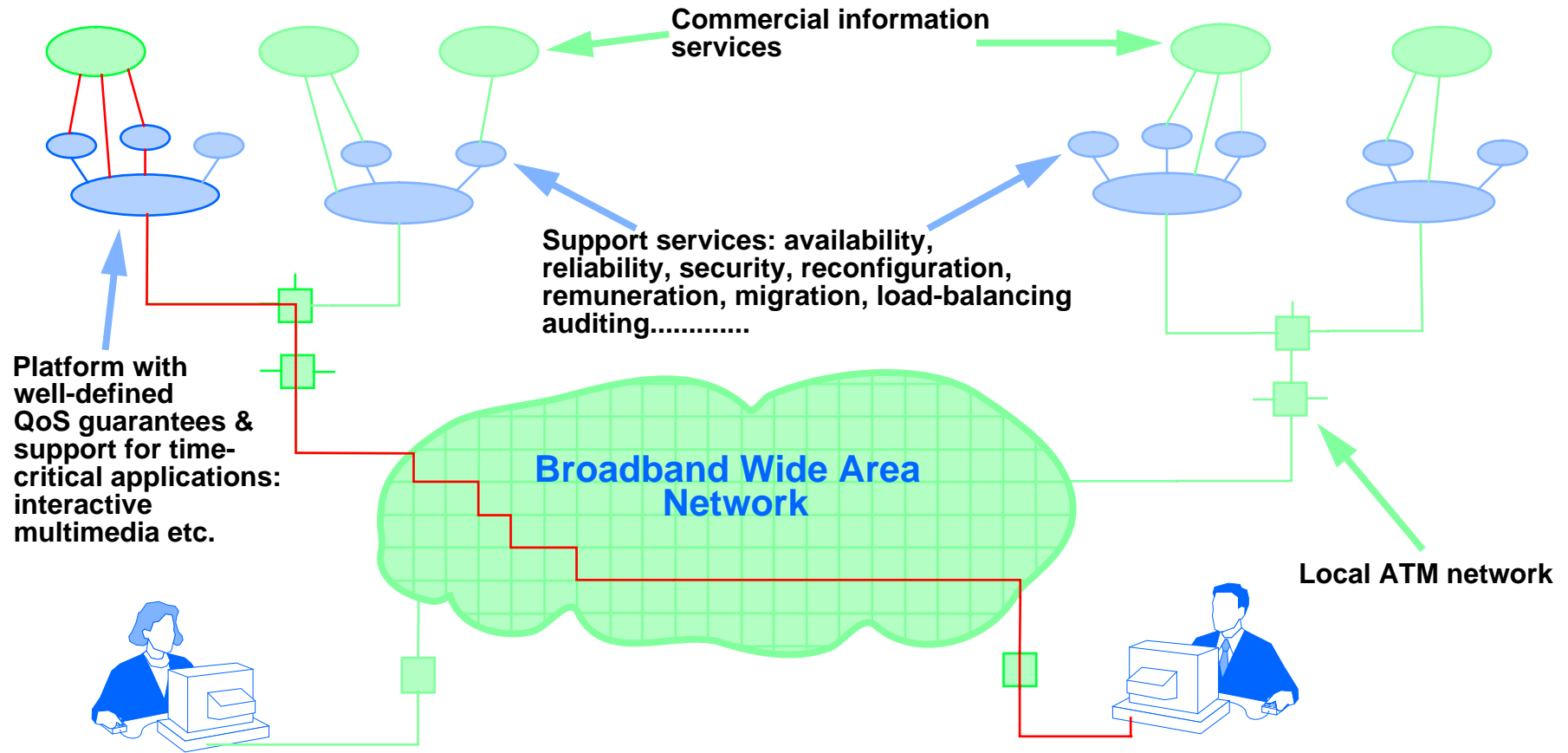
- ***How can clients find servers that provide the services that they need?***
 - **in the future, there will be millions of interconnected servers around the world**
 - **clients will come and go dynamically**
 - **servers will come and go dynamically**

Federated Trading

- The traders are federated, but the client and server need not be aware of the boundary*



Electronic Services Tomorrow





Your architecture should leave you to decide...

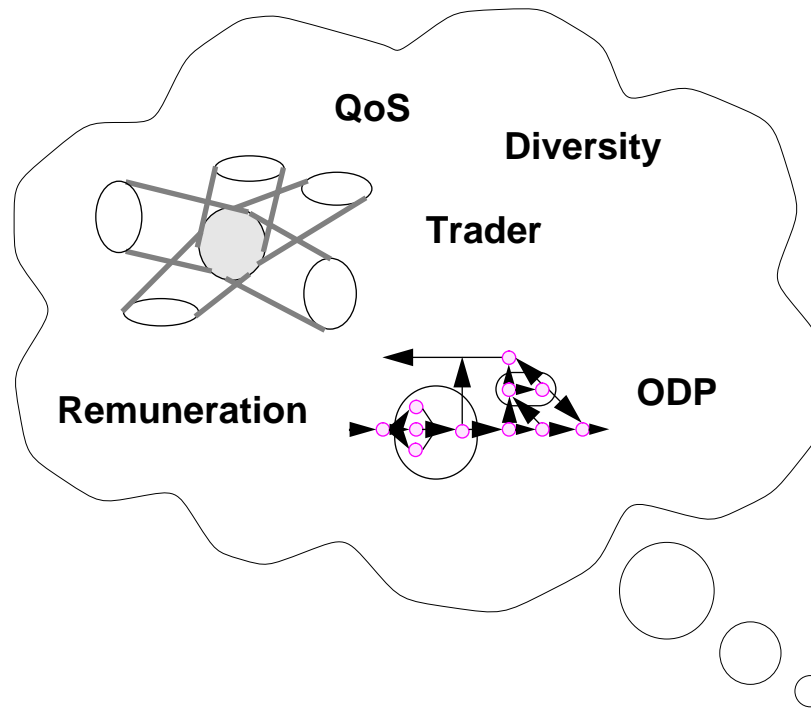
- *Which products to use*
- *Which software development methods to use*
- *Which user interfaces to provide*



Architectural principles - Summary

- *Distributed systems have different properties to centralized systems*
- *Different applications need different solutions*
- *Unnecessary complexity should be masked from the applications*

New Ideas





More about distributed systems?

- *If you want one introductory book on both technical issues and products*
 - *Distributed Computing: A Practical Synthesis, by Amjad Umar (Prentice Hall)*

- *If you want one introductory book on the technical issues only:*
 - *Distributed Systems Concepts and Design, by Coulouris, Dollimore, and Kindberg (Addison-Wesley)*

- *If you prefer a more theoretical approach:*
 - *Distributed Systems, edited by Sape Mullender (Addison-Wesley)*



More about client-server systems?

- *If you want one introductory book on both business and technical issues...*
 - *Client/Server Strategies, by David Vaskevitch (IDG Books)*
- *... or see the magazines below*



Conferences and exhibitions?

- ***Object World UK: 20-23 June 1995***
 - organized by the Object Management Group
- ***ANSAworks***
 - the ANSA conference, organized by APM
- ***The Millenium: 23-25 May 1995***
 - organized by TMA
- ***ICODP (International Conference on ODP)***
 - organized under the auspices of IFIP TC6
- ***Virtual Conference on Networked Multimedia***
 - organized by Communications International; <http://www.emap.co.uk/vc/>



Latest state of play?

- ***Magazines***
 - ***First Class*** from the Object Management Group (OMG)
 - ***Software Futures*** from APT Data Services
 - ...and the general computer press

- ***Internet newsgroups***
 - **comp.client-server**
 - **comp.object**
 - **comp.soft-sys.dce**
 - **comp.dcom.net-management**



Latest distributed systems research?

- *Journals*
 - Distributed Systems Engineering
 - Internetworking Research and Experience
 - IEEE Network
 - IEEE Computer
 - IEEE Communications
 - ACM Communications
 - Distributed Computing
 - IEEE Parallel and Distributed Systems



How we can help

- ***ANSAware***
 - **technical support**
- ***ANSAworks***
 - **the ANSA conference**
- ***ANSAwise***
 - **training in distributed systems**
- ***ANSAweb***
 - **consultancy and advice**



Contacting APM

- *We are online on the World Wide Web!*
 - our URL is <http://www.ansa.co.uk/>
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Stay in touch with APM